

Middle Fork Salmon Lower Mainstem Spring/Summer Chinook Salmon Population Population Viability Assessment

The Middle Fork Lower Mainstem population (Figure 1) is part of the Snake River Spring/Summer Chinook ESU which has five major population groupings (MPGs), including: Lower Snake River, Grande Ronde / Imnaha, South Fork Salmon River, Middle Fork Salmon River, and the Upper Salmon River group. The ESU contains both spring and summer run chinook. The Middle Fork Lower Mainstem population is a spring/summer run and is one of nine extant populations in the Middle Fork Salmon River MPG.

The ICTRT classified this population as a “basic” population (Table 1) based on historical habitat potential (ICTRT 2005). A chinook population classified as basic has a mean minimum abundance threshold criteria of 500 naturally produced spawners with a sufficient intrinsic productivity to achieve a 5% or less risk of extinction over a 100-year timeframe.

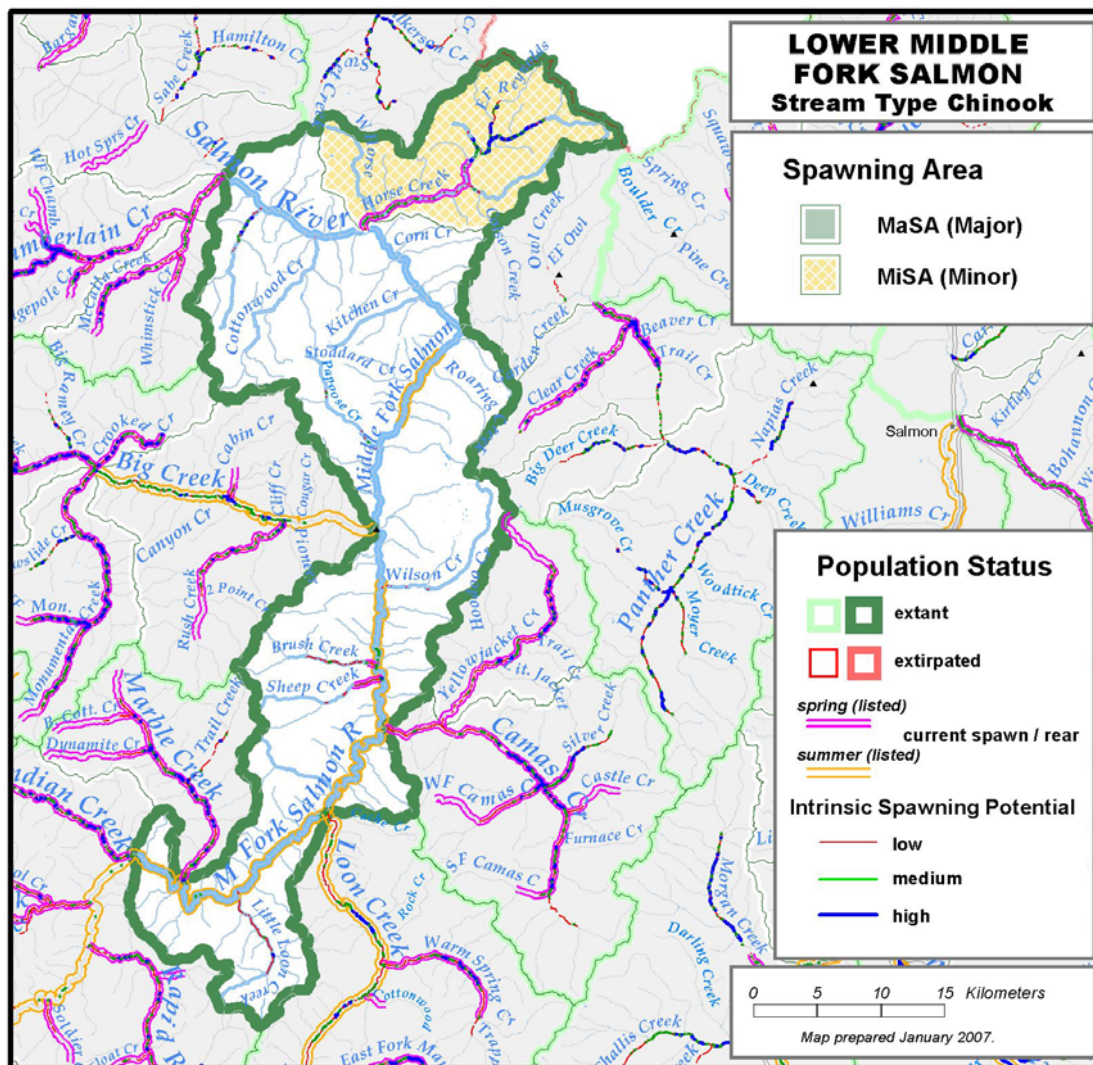


Figure 1. Middle Fork Lower Mainstem chinook major and minor spawning areas.

Table 1. Middle Fork Lower Mainstem chinook basin statistics

Drainage Area (km2)	2,249
Stream lengths km* (total)	758
Stream lengths km* (below natural barriers)	472
Branched stream area weighted by intrinsic potential (km2)	0.035
Branched stream area km2 (weighted and temp. limited)	0.035
Total stream area weighted by intrinsic potential (km2)	0.177
Total stream area weighted by intrinsic potential (km2) temp limited	0.177
Size / Complexity category	Basic / “B” (dendritic structure)
Number of MaSAs	0
Number of MiSAs	1

*All stream segments greater than or equal to 3.8m bankfull width were included

**Temperature limited areas were assessed by subtracting area where the mean weekly modeled water temperature was greater than 22°C.

Current Abundance and Productivity

Current abundance (number of adults spawning in natural production areas) is currently unknown for this population. Redd surveys have been conducted in recent years by U.S Forest Service personnel. A long time series of survey or census data is not available for this population.

Spatial Structure and Diversity

The ICTRT has identified no major spawning areas (MaSA) and one minor spawning area (MiSA) within the Middle Fork Lower Mainstem population. Intrinsic potential modeling showed no temperature limited areas within the MiSA for this population. Spawning is primarily restricted to the mainstem Middle Fork Salmon River within the population boundary. Tributaries to the mainstem within this population typically are small and high gradient. The largest tributary in the population, Horse Creek (which is tributary to the mainstem Salmon River), supports most of the recently documented spawning in the population.

Factors and Metrics

A.1.a. Number and spatial arrangement of spawning areas.

The Middle Fork Lower Mainstem spring/summer Chinook salmon population has no MaSAs and one MiSA. The total branched stream area weighted by intrinsic potential is 177,000 m². This metric is rated *High Risk* because the population lacks a major spawning area.

A.1.b. Spatial extent or range of population.

Current utilization of habitat for spawning and rearing is inferred from spawner redd counts and juvenile presence/absence and density surveys. Since 1995 researchers from the USFS-Rocky Mountain Research Station have been surveying all potential spawning habitat in the Middle Fork Salmon River drainage. Surveys are not conducted in the mainstem Salmon River tributaries. Although current distribution likely mirrors historical (at least at larger abundances), this metric is rated *Low Risk* because of lack of information on current distribution.

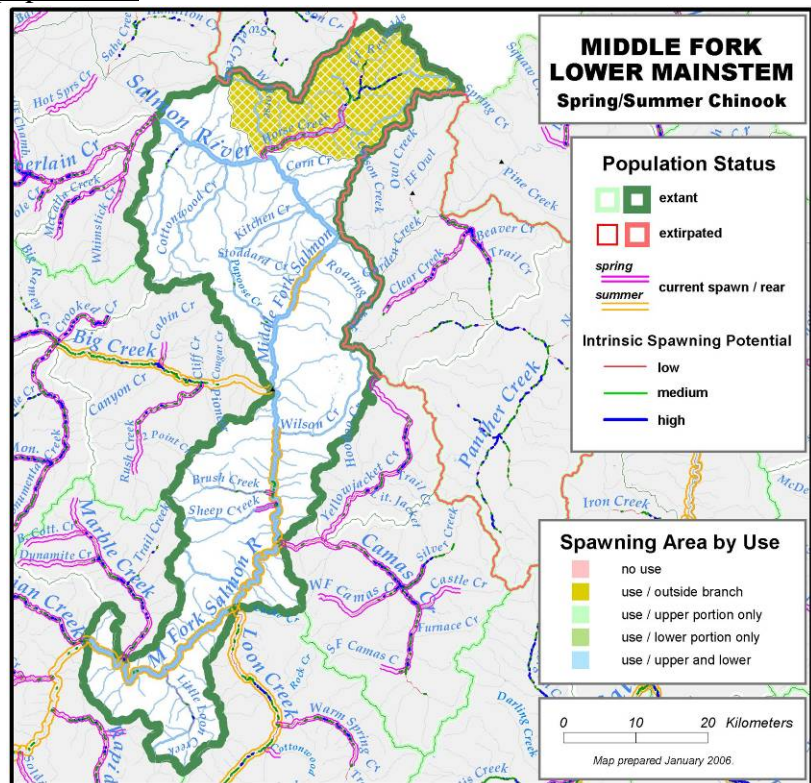


Figure 2. Middle Fork Lower Mainstem Spring/Summer Chinook current spawning distribution.

A.1.c. Increase or decrease in gaps or continuities between spawning areas.

There has been no change in gaps when comparing current and historical spawning distribution. The population is rated at *Low Risk* because the historical MaSA is occupied, gap distance and continuity have not changed, and there has been no increase in distance between this population and other populations in the MPG or ESU. This is the lowest risk rating achievable for this metric since the population did not historically contain more than 2 MaSAs.

B.1.a. Major life history strategies.

There are limited data to allow any comparisons between historic and current life history strategies. The IDFG classifies adult spawners as summer run. The known major juvenile life history strategy is a spring yearling migrant. No natural or anthropogenic impacts that could have resulted in loss of a life history strategy are known to have occurred. It appears all historic

juvenile and adult life history strategies are present, but because data is limited the metric is rated *Low Risk*.

B.1.b. Phenotypic variation.

There is no data to indicate that any phenotypic traits have been significantly changed or lost. No alterations of within-basin habitat conditions that could have resulted in loss of a phenotypic trait are known to have occurred. No major selective pressures exist which would cause significant changes in or loss of traits. Changes in the mainstem migration corridor (lower Snake and Columbia rivers) likely have altered timing of juvenile downstream passage and adult upstream passage. Because smolt entry into the estuary is substantially delayed relative to historic conditions, this metric is rated at *Low Risk*.

B.1.c. Genetic variation.

Genetic ratings were based on IC-TRT analysis of allozyme data presented in Waples et al. 1993. In addition, the IC-TRT analyzed WDFW and R. Waples, unpublished allozyme data, and P. Moran, unpublished microsatellite data. There is no data for assessing genetic variation, and this metric was tentatively rated *Moderate Risk*.

B.2.a. Spawner composition.

Spawner composition is determined from spawning ground carcass recoveries. Any marked fish that are recovered are examined for the presence of a coded-wire or PIT tag. The entire Middle Fork Salmon River MPG is managed by the IDFG as a wild production area with no hatchery intervention. While carcass surveys have been conducted annually in many of the core spawning areas in the MPG, extremely few hatchery strays have been documented. Assessment of this metric is restricted to the observation of only hatchery strays.

(1) *Out-of-ESU strays*. No out-of-ESU strays have been detected spawning in the population and this metric is rated *Very Low risk*.

(2) *Out-of-MPG strays from within the ESU*. Potential out-of-MPG fish that could stray into this population would originate from hatcheries in the downstream South Fork Salmon River MPG or upstream Upper Salmon River MPG. An exhaustive review of all spawner carcass data has not been completed however, it is possible that one or two hatchery strays were present in the population across all survey years. The occurrence of that small number of strays is not suspected of increasing risk to the population and this metric is rated *Very Low risk*.

(3) *Out of population within MPG strays*. There is no within-MPG hatchery program, and this metric is rated *Very Low Risk*.

(4) *Within-population hatchery spawners*. There is no within population hatchery program, and this metric is rated *Very Low risk*.

The overall risk rating for metric B.2.a “spawner composition” is *Very Low Risk* since the population and entire MPG are managed for wild production and essentially no hatchery strays have been observed spawning in the population.

B.3.a. Distribution of population across habitat types.

The Middle Fork Lower Mainstem population intrinsic potential habitat historically was distributed across one EPA level IV ecoregion (Southern Clearwater Forested Mountains – 100%). There was a substantial change in ecoregion occupancy as the population is now primarily distributed in the Hot Dry Canyons and Southern Forested Mountains ecoregions. Because of the substantial change in ecoregion occupancy this metric was rated *Moderate Risk* for the population.

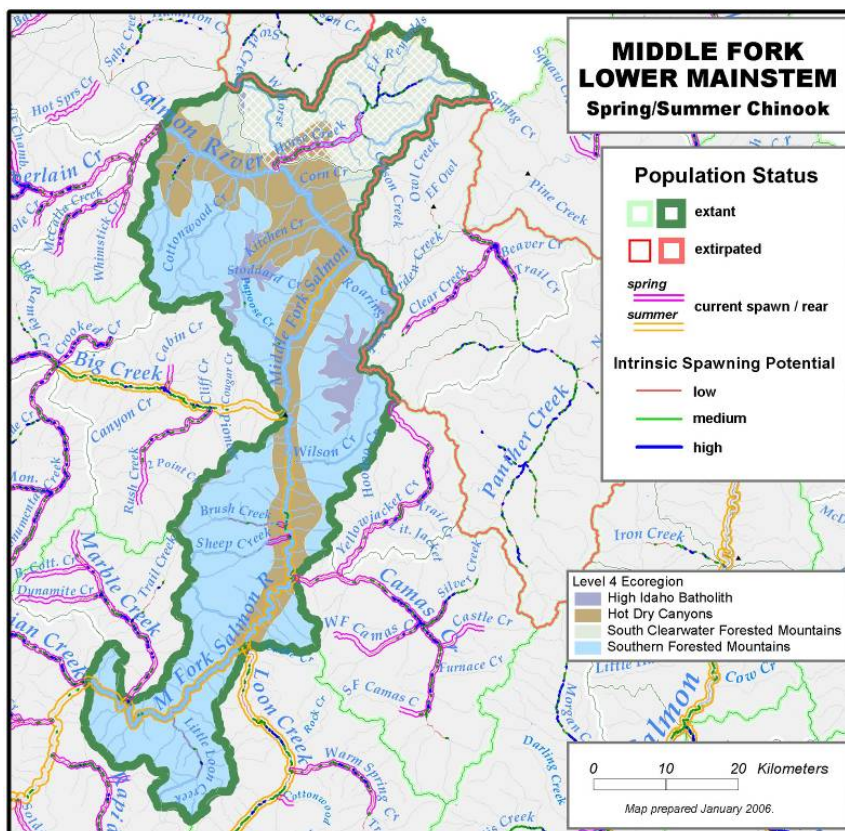


Figure 3. Middle Fork Lower Mainstem Spring/Summer chinook population distribution across various ecoregions.

Table 2. Middle Fork Lower Mainstem Spring/Summer Chinook—proportion of spawning areas across various ecoregions.

Ecoregion	% of historical branch spawning area in this ecoregion (non-temperature limited)	% of historical branch spawning area in this ecoregion (temperature limited)	% of currently occupied spawning area in this ecoregion (non-temperature limited)
South Clearwater Forested Mountains	100.0	100.0	18.9
Hot Dry Canyons	0.0	0.0	71.5
Southern Forested Mountains	0.0	0.0	9.6

B.4.a. Selective change in natural processes or selective impacts.

Hydropower system: The hydrosystem and associated reservoirs impose some selective mortality on smolt outmigrants and adult migrants, the selective mortality is not likely to remove more than 25% of the affected individuals. The likely impacts are rated as *Low Risk* for this action.

Harvest: Recent harvest rates for spring/summer Chinook salmon are generally less than 10% annually. There are no freshwater fisheries directly targeting wild spring/summer Chinook salmon; indirect mortalities are expected to occur in some fisheries selective for hatchery fish. It is not likely that the incidental mortality is selective for a particular group of fish or if it is, it would not select 25% or more of that particular group, therefore this action was rated as *Very Low risk*.

Hatcheries: The proportion of hatchery strays has always been estimated as 0%. This selective impact was rated *Very Low Risk*.

Habitat: Habitat changes resulting from natural events or anthropogenic impacts may impose some selective mortality, but the extent is unknown. Habitat in the basin has been impacted by grazing activities, water diversions on tributary streams and naturally occurring forest fires. It is likely that any selective mortality imposed as a result of habitat alterations in the basin would impact a non-negligible portion of the population. This selective impact was rated *Very Low Risk*.

Spatial Structure and Diversity Summary

Overall spatial structure and diversity has been rated *Moderate Risk* for the Middle Fork Upper Mainstem population (Table 4). The *Moderate* risk rating assigned to this population is driven by both the overall spatial structure score (Goal A) and the genetic variation score (metric B.1.c.) which in turn is influenced by a lack of data. It is very possible the actual risk for the genetic variation metric is Low or Very Low, and the population's overall spatial structure/diversity risk is Low. Potential genetic bottlenecks resulting from recent low adult escapements are unknown. Historically this population may have been at an elevated risk status (e.g. Moderate) with respect to spatial structure because of the limited amount of spawning habitat in the population and the distribution of that habitat.

Table 3. Middle Fork Lower Mainstem Spring/Summer Chinok population spatial structure and diversity scoring table

Metric	Risk Assessment Scores					
	Metric	Factor	Mechanism	Goal	Population	
A.1.a	H (-1)	H (-1)	Moderate Risk (Mean=0.33)	Moderate Risk	Moderate Risk	
A.1.b	L (1)	L (1)				
A.1.c	L (1)	L (1)				
B.1.a	L (1)	L (1)	Moderate Risk	Moderate Risk		
B.1.b	L (1)	L (1)				
B.1.c	M (0)	M (0)				
B.2.a(1)	VL (2)	VL (Mean=2)	Very Low Risk (Mean=2)			Moderate Risk
B.2.a(2)	VL (2)					
B.2.a(3)	VL (2)					
B.2.a(4)	VL (2)					
B.3.a	M (0)	M (0)	Moderate Risk			
B.4.a	L (1)	L (1)	Low Risk			

Overall Viability Rating

The Middle Fork Lower Mainstem spring/summer Chinook salmon population does not currently meet population-level viability criteria. Abundance/productivity status cannot be determined because there is no data available. The abundance/productivity status is tentatively rated at High Risk, consistent with the seven populations in the Middle Fork Salmon River MPG where data was available to determine risk status. Improvement in abundance/productivity status (reduction of risk level) most likely will need to occur before the population can be considered viable. Also, the population currently does not meet the criteria for a “maintained” population. It is questionable as to whether or not the population could ever achieve highly viable status because of spatial structure constraints.

		Spatial Structure/Diversity Risk			
		Very Low	Low	Moderate	High
Abundance/ Productivity Risk	Very Low (<1%)	HV	HV	V	M
	Low (1-5%)	V	V	V	M
	Moderate (6 – 25%)	M	M	M	
	High (>25%)			Middle Fork Lower Mainstem	

Figure 4. Viable Salmonid Population parameter risk ratings for the Middle Fork Lower Mainstem Spring/Summer Chinook salmon population. This population is not currently meeting viability criteria. Viability Key: HV – Highly Viable; V – Viable; M – Maintained; Shaded cells – does not meet viability criteria (darkest cells are at highest risk).